atmosphere

MDPI

Supplementary materials for the paper "Megacity-induced mesoclimatic effects in the lower atmosphere: a modelling study for multiple summers over Moscow, Russia"

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Content of this file: Figure S1 to S5

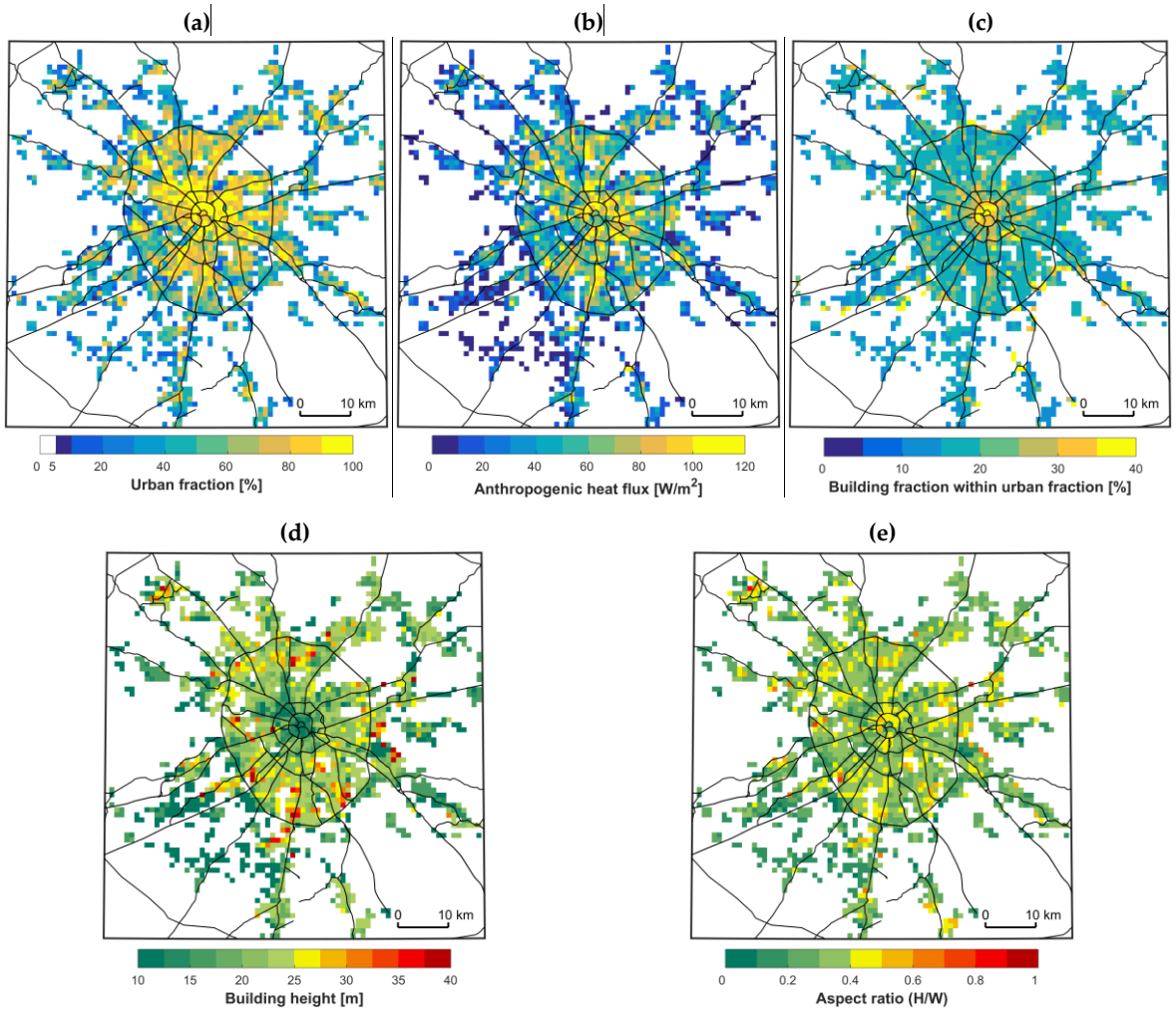

Figure S1. Spatial distribution of the urban fraction (a), mean annual value of anthropogenic heat flux (b), building fraction within urban fraction (c), mean building height (d) and street canyon aspect ratio (e) used in numerical simulations. Partially adopted from [43]. Black lines represent primary road network in Moscow region according to OpenStreetMaps data.

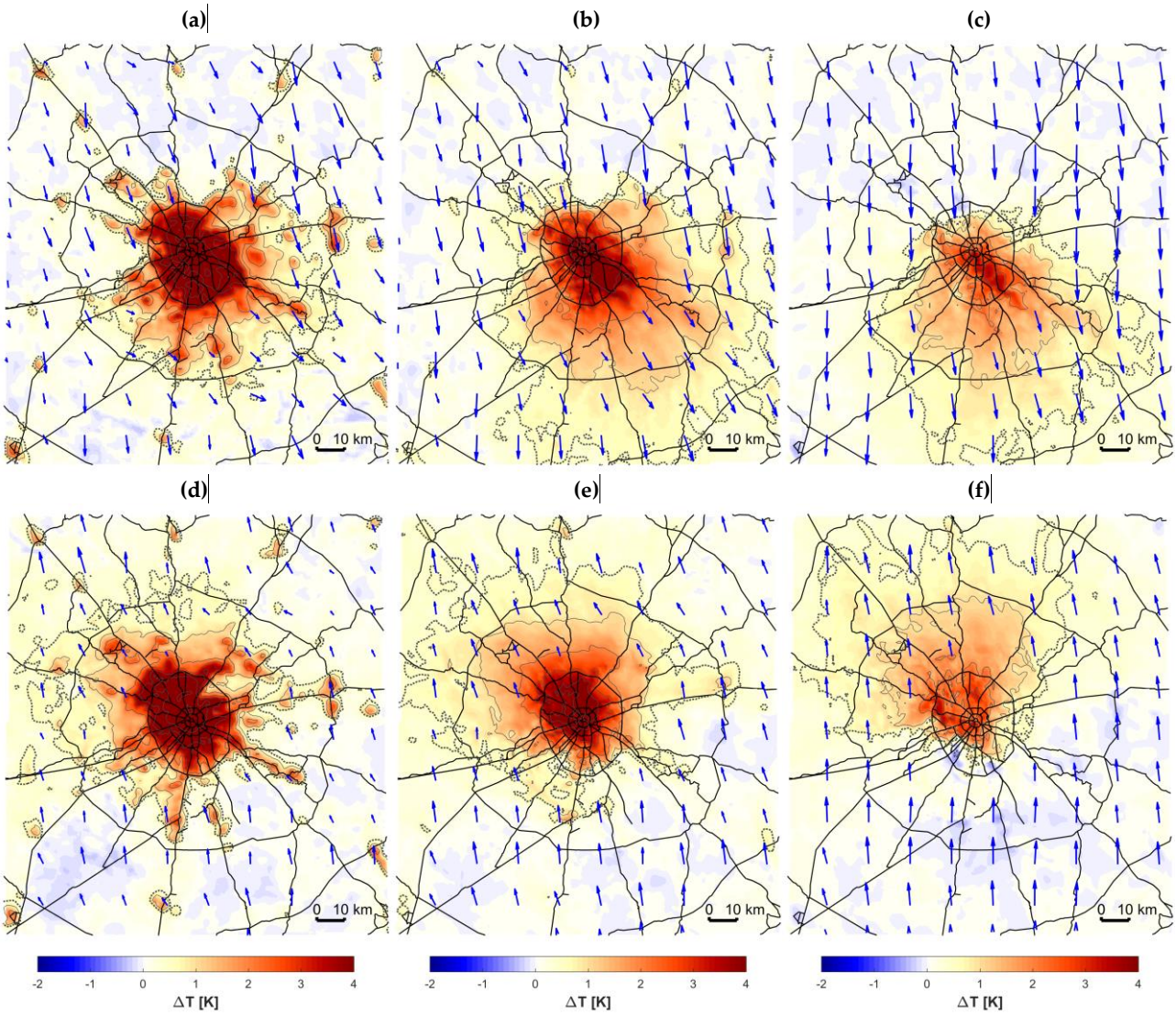

Figure S2. The modelled temperature response to switching on the urban canopy model (Δ*T*) at the 1st (a, d), 2nd (b, e) and 3rd (c, f) model levels with corresponding heights above the surface equal to 10, 34 and 71 m, averaged over selection of nocturnal cases (0-1 UTC/3-4MSK) with prevailing northern (a, b, c) and southern wind (d, e, f). Considered cases (same as for **Figure 6**) are sampled out of selection of days with intensive urban heat island during June-August 2014. Blue arrows show the wind speed and direction at corresponding model levels according to "URB" simulations.

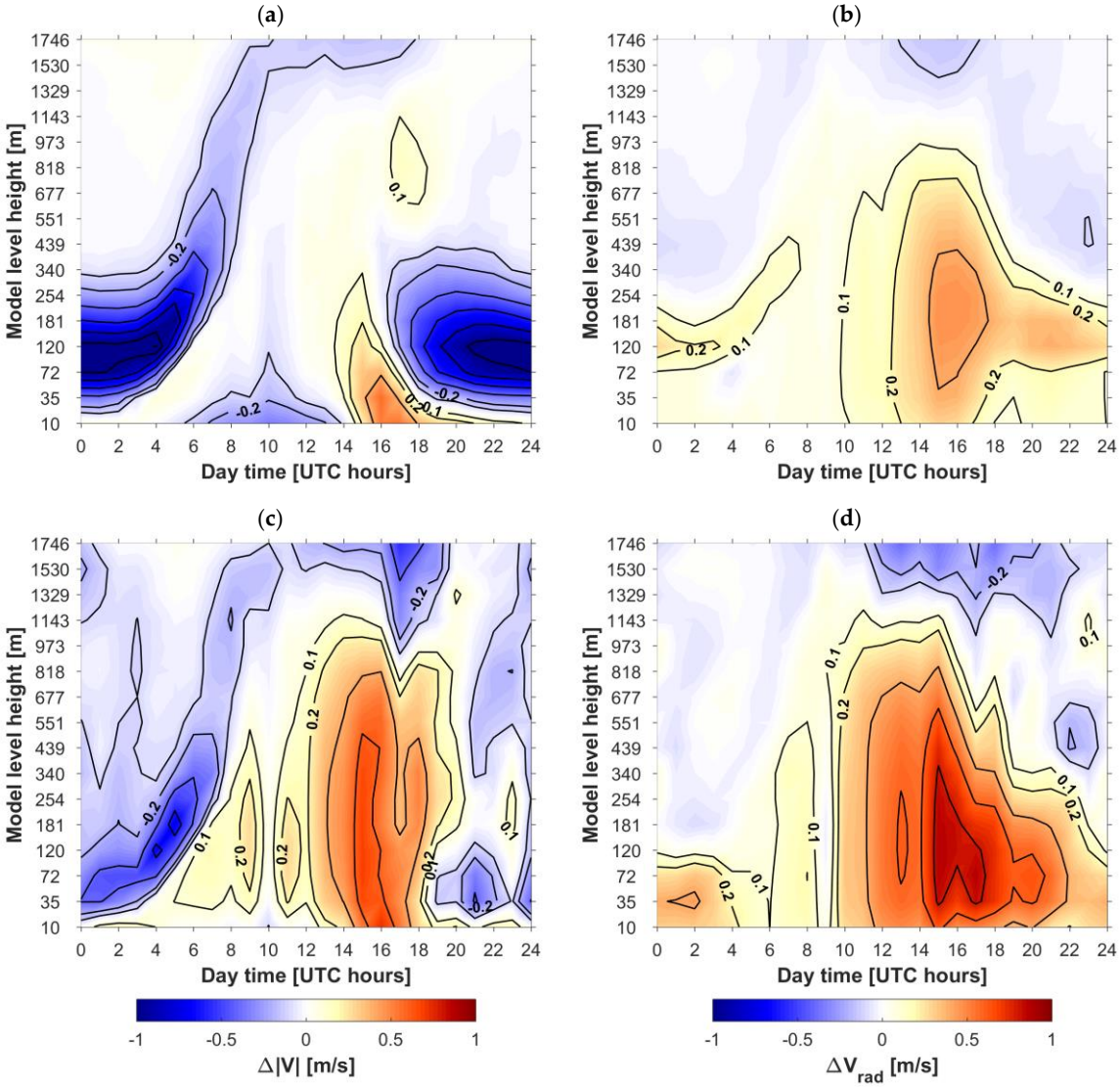

Figure S3. The dependence of the modelled response of the wind speed ($\Delta|V|$) (a, c) and its radial component (ΔV_{rad}) (b, d) to switching on the urban canopy model from the height and day time built for the basic selection of days with pronounced urban heat island during summer 2014 (a, b) and for the selection of cases with low wind speed (c, d).

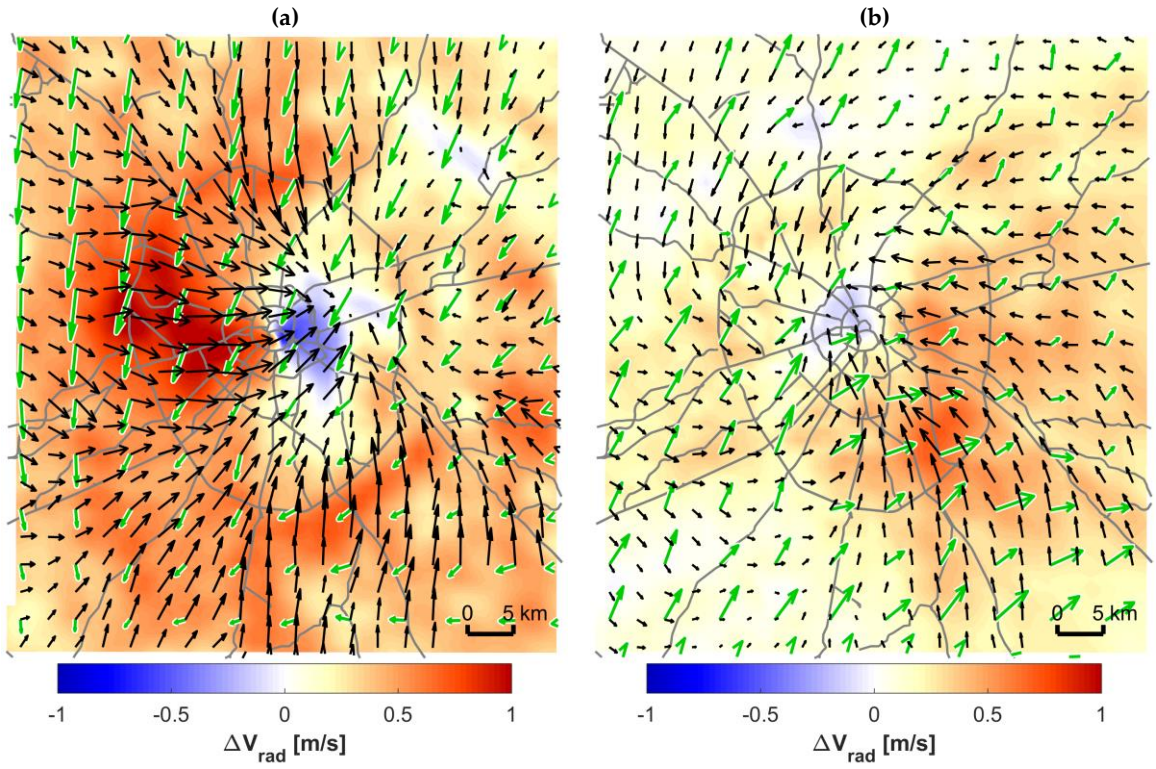

Figure S4. The vector field of the modelled wind response to switching on the urban canopy model ($\Delta\overline{V}$, shown by black arrows) and response of the radial wind speed component (ΔV_{rad}, shown by color) at 4th model level (20 m), averaged over **all** evening (15-16 UTC/18-19 MSK) (a) and nocturnal cases (0-1 UTC/3-4MSK) (b) for the days with pronounced urban heat island during the summer of 2014. Designations are similar to Figure 10, but different color scale is used.

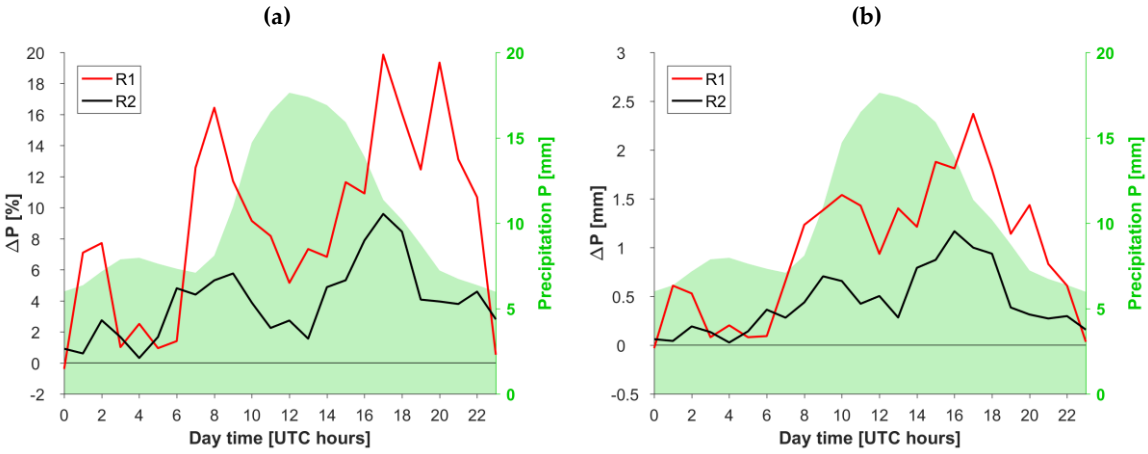

Figure S5. The diurnal course of the relative (a) and absolute (b) values of the modelled summer precipitation response to switching on the urban canopy model (ΔP), averaged over R1 and R2 areas (red and black lines correspondingly) and over the 10 summer seasons. Value for each hour represents the accumulated amount during the previous hour. The green shading represents the diurnal course of hourly precipitation amounts, averaged over whole D3 domain according "noURB" simulations.